WHAT IS CLAIMED IS:

1. Method for grinding and polishing of free-form surfaces, in particular of rotationally symmetric aspherical optical surface areas such as lenses or mirrors, by a tool or several tools, wherein a virtual removal of a preprocessed, preferably pre-grinded optical surface is calculated by a preferably interferometrical measurement and comparison of an observed actual shape with a specified shape, contact pressure, speeds of rotation and, respectively, dwell times or movement of the tool or of the tools are controlled due to the virtual removal and additionally the surface of the optical surface area is arranged in subareas, characterized in that a zeroth order approximation is calculated for the control of the tool or of the tools, a mutual interaction of the subareas is estimated by means of the zeroth order approximation and a dwell time course for the tool or for each tool for each subarea is calculated by a linear system of equations by taking into account the estimated interaction, contact pressure, speed of rotation of the tool and behavior of the polishing agent of, respectively, the tool or the tools for each subarea and the tool or the tools are controlled accordingly.

2. Method according to claim 1, characterized in that the subareas correspond to the size of the tool or of one of the tools.

3. Method according to claim 1, characterized in that the subareas correspond to the double size of the tool or of one of the tools.

4. Method according to one of the claims 1 to 3, characterized in that the dwell time of the tool or of one of the tools is varied for controlling the removal.

5. Method according to one of the claims 1 to 3, characterized in that the speed of rotation of the tool or of one of the tools is varied for controlling the removal.

6. Method according to one of the claims 1 to 3, characterized in that the speed of rotation of the workpiece is varied for controlling the removal.

7. Method according to one of the claims 1 to 3, characterized in that the contact pressure of the tool or of one of the tools is varied for controlling the removal.

8. Method according to one of the claims 1 to 7, characterized in that for a correction of the surface, only the minimally necessary removal is removed.

9. Method according to one of the claims 1 to 8 for rotationally symmetric free-form surfaces, in particular spherical lenses or mirrors, characterized in that the virtual removal is transferred to an one-dimensional form, and the coarsely pre-grinded for example lens is rotating during the grinding and polishing.

10. Method according to one of the claims 1 to 9, characterized in that for achieving a desired accuracy of the surface's shape only one grinding or polishing is carried out, which causes only a short processing time of about ten or less minutes.

11. Method according to one of the claims 1 to 9, characterized in that with or without a preferably interferometrical remeasurement or a different remeasurement a small number of times of grinding or polishing are carried out with tools downsized each time, which brings highest accuracy along and ensures a saving of time compared to one-time grinding or polishing with the smallest tools.

12. Method according to one of the claims 1 to 11, characterized in that the subareas do not overlap.

13. Method according to one of the claims 1 to 11, characterized in that the subareas overlap slightly.

14. Method according to one of the claims 1 to 11, characterized in that the subareas overlap very heavily.

15. Method according to one of the claims 1 to 11, characterized in that the subareas overlap so much that they differ only about one value or few values.

16. Method according to one of the claims 1 to 11, characterized in that the subareas exhibit different sizes.

17. Aspherical glass lens with an accuracy better than 600 nanometers, grinded and polished within about 20 minutes.

18. Aspherical glass lens with an accuracy better than 600 nanometers with concave surface, grinded and polished using a BestFit radius of curvature of less than 50 mm within a time of about 40 minutes.

19. Correction tool for the processing of rotationally symmetric free-form surfaces, in particular aspherical lenses or mirrors, which rotates and is used with the aim to correct the surface and is radially moveable, characterized in that the ratios between the size of the tool and the diameter of for example the lens is an eighth to a quarter.

20. Tool for the processing of rotationally symmetric free-form surfaces, in particular aspherical lenses or mirrors, which rotates and is used with the aim to correct a surface and is radially moveable characterized by a size being twice as wide as the narrowest mountain of errors on the free-form surface which shall be removed.

21. Tool with a polishing or grinding foil consisting of polyurethane in particular, characterized by a material of the polishing or grinding foil without bubbles and without indentations or other inhomogeneities.

22. Tool analogous to claim 21 with intentionally inserted chinks with steep to perpendicular edges for a better supply of polishing agent or cooling agent, wherein the chinks are large enough not to be obturated by polishing agent or cooling agent.

23. Arrangement of tools which exhibits several tools processing simultaneously the free-form surface apart from a planar area.

24. Arrangement of tools according to claim 23, characterized in that the single tools overlie the surface with perpendicular orientation.

25. Arrangement of tools according to claim 23 or 24, characterized in that each of the single tools moves on a radial line of a rotationally symmetric free-form surface.

26. Arrangement of tools according to claim 23 or 24, characterized in that each of the single tools moves on a non-radial line of the free-form surface.

27. Arrangement of tools according to claim 23 or 24, characterized in that the single tools do not move on the free-form surface.

28. Arrangement of tools according to claim 23 to 27, characterized in that the single tools are arranged on the free-form surface in such a way that, in case of a rotating free-form surface, the entire free-form surface is processed.

29. Arrangement of tools according to claim 23, characterized in that the simultaneously processed surface amounts more than five percent of the free-form surface with exception of the planar area and the spherical area.

30. Arrangement of tools according to claim 23 to 25, characterized in that the single tools are controlled separately.

31. Tool according to claim 23, characterized by a movable foot at its processing side, wherein the foot orients itself such that the tool overlies the free-form surface tangentially.

32. Arrangement of tools according to one of the claims 23 to 31, characterized in that the single tools are available in compounds.

33. Tool according to claim 32, characterized in that the compounds are rod-shaped.

34. Tool according to claim 32, characterized in that the compounds are round.

35. Arrangement of tools according to one of the claims 32 to 34, characterized in that the compounds of the single tools are positioned across the free-form surface and moved as a single tool.

36. Method according to one of the claims 1 to 16, characterized in that the existing accuracy remains preserved or gets improved during, respectively, the pre-polishing or the polishing of the free-form surface after the grinding.

37. Arrangement of tools according to claim 30, characterized in that the single tools are controlled according to one of the claims 4 to 7.